Tiscia (Szeged) Vol. XIV, pp. 41—61 (1979)

ALGOLOGICAL INVESTIGATIONS IN THE DEAD ARMS OF THE RIVER TISZA AT TISZAALPÁR AND TISZAUG

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(Received June, 25. 1978)

Abstract

The present paper briefly summarizes the alga flora and vegetation of two dead arms of the Tisza river on the basis of investigations made between 1975–1978. In the two biotops, 258 species or intra-species taxons were found. Beyond the respects of nature conservation, the investigation was prompted mainly by the fact that the two bodies of standing water would have different fates in the future. The smaller one at Tiszaug remains a dead arm utilized as a fishery in the future. The larger one at Tiszaalpár and its wider surroundings will be included by a reservoir of the future Tisza-III barrage where the dammed up water will be utilized for agricultural irrigation and recreation purposes. Hydrobiological-algological aspects of the tasks to be done before building the water reservoir are also discussed.

Introduction

The algological study of the dead arms at Tiszaalpár and Tiszaug villages was made during the years 1975–1978 simultaneously with similar investigations in another dead arm at Lakitelek–Tőserdő (Kiss 1978, 1978a). A research project aimed at different aspects of the natural conditions is in progress in the area, partly in the organization of the Tisza Research Committee. The research work is made necessary mainly by the planned construction of the Tisza–III barrage and the connected water reservoir. As it seems likely that the barrage and the reservoir will significantly alter the natural conditions of the Tisza district north of Csongrád village, studying the present conditions is important also in the respect of nature conservation. The general conclusion that a planified guidance or influence of the prevailing present conditions needs the knowledge of the past, is also valid in this case. This refers to the factors of both the abiotic and biotic environment.

The water system of Tisza is relatively young. The present river has been collecting the waters from the edges of the Plainland for several thousands of years. The slow-flowing Tisza shaped very large bends on the present surface which has been evolved for the Quaternary. Some of these bends have been eliminated by the river itself since the beginning of the Holocene, others were artifically cut off during the second half of the last century in connection with the control of the river. These events resulted in the dead arms arranged on both sides of the river. The dead arm at Tiszaug, on the left bank, was mainly resulted by natural detachment while the ones at Lakitelek–Tőserdő and Tiszaalpár located to the west and south of the

former one, respectively, were formed by artifically cutting through former bends. The dead arms at Tiszaug and Tiszaalpár lie on the relief of deep early Holocene inundation area while the dead arm at Tőserdő, situated between the two former ones, joins an extension of the vast sandland of Kiskunság. Consequently, the latter one is surrounded by a wavy relief and its bed is deeper than that of the former two. These differences make one more reason for having published the account on the investigations at Tőserdő separately (Kiss 1978).

The two dead arms we are dealing with lie on lower places of an early Holocene relief but they are not entirely uniform. As it was mentioned, the relatively small bed of the dead arm at Tiszaug was formed through the natural detachment of a bend more than one thousand years ago while the one at Tiszaalpár was resulted in by the artificial control of the river. Therefore, the small dead arm at Tiszaug shows an advanced stage of alluvial filling in and has no real depths. The dead arm at Tiszaalpár is a huge, U-shaped formation, it is generally deep and mostly retained the original character of the river bed. The former one is barely 2 km long, while the total length of the latter is more than 10 km. First of all, it was this great difference in size why I did not study the two dead arms in equal details. I walked along the whole length of the Tiszaug dead arm while in the case of the other one I studied only a part of the bed near to Tiszaalpár community, i. e. between the old Alpár and Tiszaújfalu villages. This part is still 2 km long at least. As the planned water reservoir will also run along Tiszaalpár community through about a 4 km distance, studying the parts of the present dead arm near to the village seemed to be logical in the respect of nature conservation. At some parts of the area the water became strongly eutrophic because of the large amount of the contaminating organic material.

Studying the dead arm along its total length as well as exploring the natural conditions of the so-called field of Alpár awaits for future work. At least the latter one is indispensible as the future reservoir will also include the field of Alpár till about the distance of Bokros community where the waters of the meadow-land reach the Tisza. According to the preliminary plans, the reservoir will be longer than 10 km and its largest diameter will reach 4,5 km.

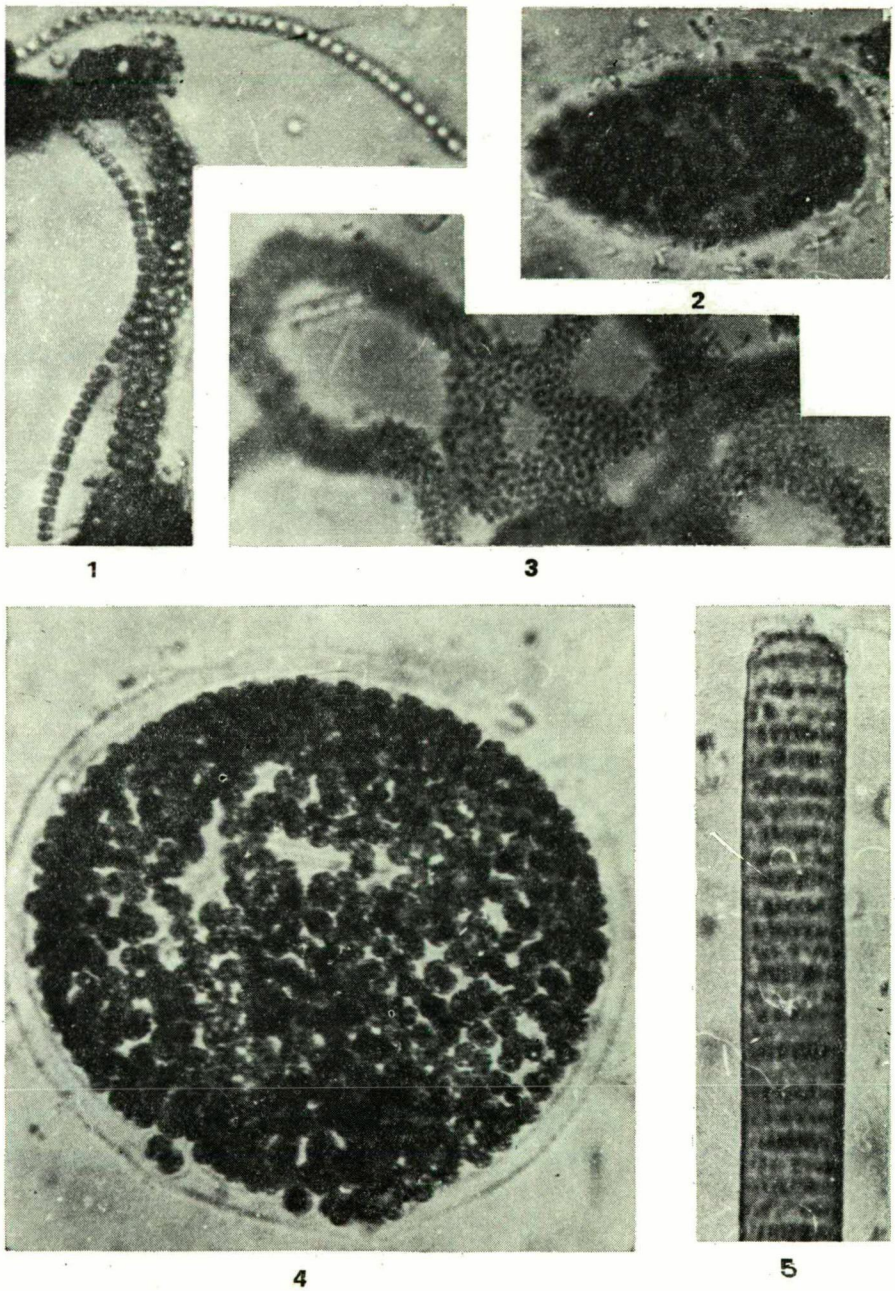
Materials and Methods

Places for water sampling were selected with reference to the ecological conditions. Samples were collected from 4 and 3 places at Tiszaalpár and Tiszaug, respectively, from both the shallow littoral and the deeper pelagic zones. In some of the ladled samples, quantitative determinations were made with the aid of a Bürker chamber. The pH value of the water at Tiszaalpár was between 7.2–7.6. Mostly similar pH values were found also at Tiszaug although in one case (August 4, 1978) pH 8 was measured in the east bend of the dead arm. This could refer to a weak sodification. The alga species were determined in living material and specimens of the more characteristic or rare species were photographed.

Results

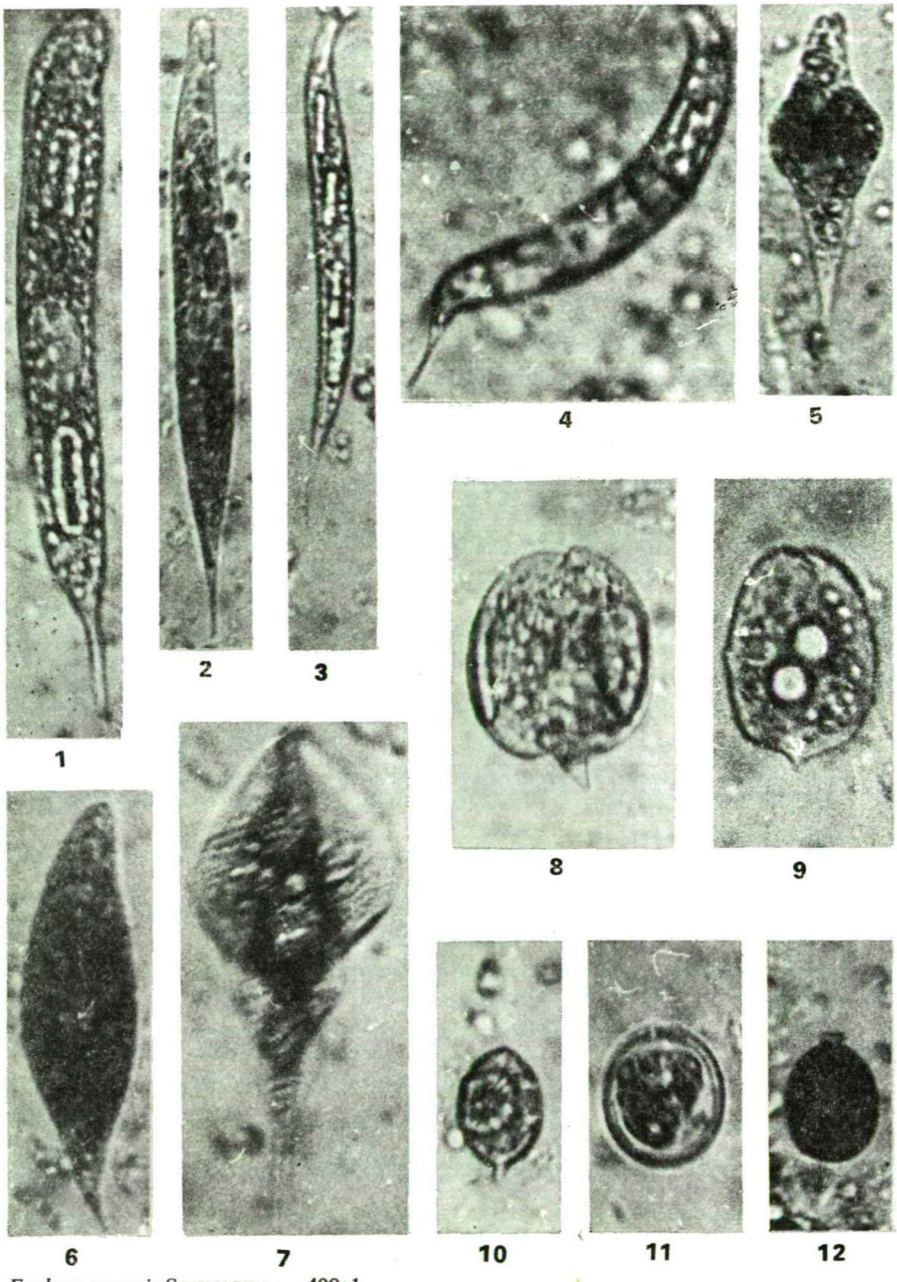
Up to the present, 258 species or sub-specific taxons of algae have been found in the dead arms at Tiszaalpár and Tiszaug. Their distribution according to the phyla is as follows: *Schizomycophyta:* 4, *Cyanophyta:* 69, *Euglenophyta:* 34, *Chrysophyta:* 39, *Pyrrhophyta:* 9, *Chlorophyta:* 103. The *Chlorophyta* phylum is represented by the highest number of taxons but the *Cyanophyta* are also very numerous. The taxons found and the temporary frequencies of their occurance are listed in Table 1 (continued through several pages). We tried to demonstrate their quantitative presence according to the following estimated scale of score-grades:

Plate I



1. *Stigonema spec. (? Stigonema minutum* [AG.] HASS.*)* — 300:1.
2. *Phormidium mucicola* HUBER-PESTALOZZI et NAUMANN — 200:1
3. *Microcystis aeruginosa* f. *pseudofilamentosa* ELENK. — 200:1.
4. *Coelosphaerium dubium* GRUNOW — 750:1.
5. *Oscillatoria maior* VAUCHER — 700:1.

Plate II



1. *Euglena oxyuris* SCHMARDA — 400:1.
2. 3. *Euglena acus* EHRENB. — 2. = 500:1, 3. = 450:1.
4. *Euglena acus* EHRENB. ? forma — 750:1.
5. *Euglena caudata* var. *minor* DEFLANDRE — 750:1.
6. *Euglena proxima* DANGEARD — 800:1.
7. *Phacus helikoides* POCHMANN — 800:1.
8. *Phacus alatus* KLEBS — 1200:1.
9. *Phacus acuminatus* STOKES — 1000:1.
10. *Lepocinclis Lefevrey* CONRAD — 700:1.
11. *Trachelomonas volvocina* EHRENBERG — 1200:1.
12. *Trachelomonas scabra* PLAYFAIR — 800:1.

1 = rare occurance; 2 = sporadic occurance; 3 = frequent occurance; 4 = occurance en mass, development of mass-production.

As it can be seen in Table 1, most of the taxons occurred in both dead arms. From this we can infer that there are no extreme differences in the quality of the water between the two dead arms. However, the quantitative frequencies of the species, the presence or absence of some of them refer to certain differencies in the water quality and, at the same time, show that the requirements of the various species can considerably differ from each other and their tolerance for extreme conditions can also be different. In this respect the following observations are worth to mention:

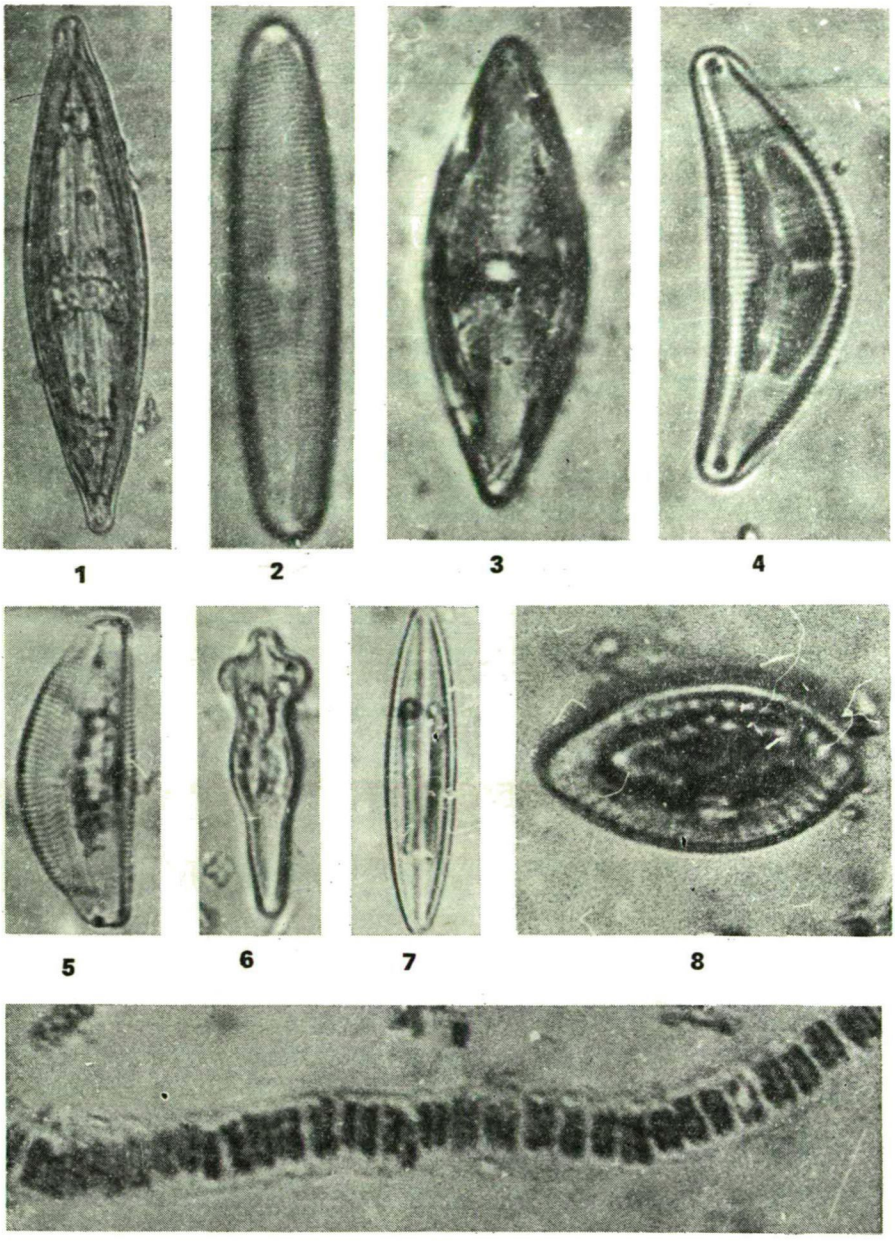
1. Several species were found in all the water samples from both dead arms. It is likely that at least some of them belong to the so-called eurytropic group of species having a really wide tolerance. Such species can be: *Spirulina maior, Euglena acus, Euglena proxima, Phacus pyrum, Trachelomonas volvocina, Trachelomonas scabra, Caloneis amphisbaena, Surirella ovalis, Ankistrodesmus falcatus, Coelastrum microporum, Crucigenia tetrapedia, Scenedesmus acuminatus, Scenedesmus ecornis, Scenedesmus denticulatus, Scenedesmus quadricauda, Pediastrum simplex, Pediastrum tetras.* It is probable, however, that in an experimental test, really extreme conditions would be necessary to recognize the really eurytropic species. The fairly wide tolerance of the above-mentioned 18 species is also supported by the fact that they can occur in strongly alkaline, sodic waters, especially when contaminated with a thin solution of manure components. A deeper, genetic study of this phenomenon would probably lead very far.

2. Some of the species were found exclusively in the water of one or the other dead arms. The following taxons were determined only in samples of the *dead arm at Tiszaalpár: Beggiatoa alba, Gloeocapsa crepidinum, Eucapsis minor, ? Tetrachloris inconstans, Merismopedia punctata, Holopedia Dieteli, Dactylococcopsis Elenkinii, Gloeotrichia Rabenhorstii, Anabaena variabilis, Oscillatoria planctonica, Oscillatoria animalis, Oscillatoria chalybea, Oscillatoria maior, Euglena polymorpha, Lepocinclis ovum, Phacus helikoides, Phacus alatus, Strombomonas verrucosa* var. *conspersa, Strombomonas verrucosa* var. *zmiewika.* The mentioned species comprise a considerable proportion of the total *Cyanophyta* and *Euglenophyta* taxons found. Of the green algae, *Kirchneriella irregularis, Dactylococcus infusionum* and *Tetrastrum triacanthum* were found only in the dead arm at Tiszaalpár while *Tribonema affine, Tribonema minus, Ceratium hirundinella, Peridinium Volzii, Peridinium palatinum, Chlamydomonas intermedia, Ankistrodesmus Braunii* var. *pusilla, Quadrigula Chodatii, Dictyosphaerium pulchellum, Tetrastrum triacanthum* as well as representatives of the *Closterium* and *Cosmarium* species were detected only in the dead arm at Tiszaug. We can not explain the mentioned cases of exclusive occurence, probably many more observations and experimental investigations would be needed for that. In the case of *Closterium* and *Cosmarium* species we can suppose that their exclusive occurence in the dead arm at Tiszaug is a consequence of the cleaner water of this biotop containing much less contaminating organic material. It can be supposed that the really *stenotopic* species having specific needs and narrow tolerance will be found among such taxons of exclusive occurence.

Vegetational forms of the algal flora

The vegetational forms of algae, i.e. the form of their external appearance, can be characterized the best according to their spatial arrangement. They can float in the water space or sit down into some substratum. Of the forms in the water space, the *plankton* was the most frequent causing a vegetational coloration (coloratio

Plate III



1. *Stauroneis parvula* var. *prominula* GRUNOW — 1500:1.
2. *Pinnularia viridis* var. *sudetica* (HILSE) HUSTEDT — 700:1.
3. *Navicula placentula* f. *lanceolata* GRUNOW — 1100:1.
4. *Cymbella cistula* (HEMPRICH) GRUNOW — 600:1.
5. *Cymbella tumida* (BRÉB.) VAN HEURCK — 600:1.
6. *Gomphonema acuminatum* EHRENBERG — 800:1.
7. *Navicula gracilis* EHRENB. — 900:1.
8. *Surirella ovalis* BRÉB. — 750:1.
9. *Hormidiopsis crenulata* (KÜTZING) HEERING — 400:1.

planktogenea) of the water in the case of mass-production *(Euglena polymorpha, Chlamydomonas, Eudorina)*. In rare cases, the phytoplankton mass-productions were transformed into the *phytoneuston* form (coloratio phytoneustogenea). Mass-productions of the filamentous algae appeared in the *lasion* or *pleuston* vegetational forms *(Tribonema, Cladophora, Spirogyra, Mougeotia)*. The coloratio phytoneustogenea mostly coloured the water space beneath the surface, too, and appeared only in very rare cases concentrated on the surface (water bloom, flos aquae). Mass-productions causing vegetational colouration sometimes developed on the surface of the soil, e.g. in the drying up littoral zone (flos humi). Sometimes a picturesque sight was offered by the coloration caused by algal mass-productions on the wall of the dead arm at Tiszaalpár, near to the old Alpár village. In some cases the greenish or bluish-black colour appeared in spots or stripes ranging to several meters on the nearly perpendicular surface of 6–8 m high river wall. The vital wetness was provided by the water running down from time to time from the edge of the wall. The most abundant constituents of these mass-productions were species of the phylum *Cyanophyta*. Old farmers told me also here that a sudden, temporary intensification of the colour of these spots and stripes notifies rain or rainy weather in advance. The meteoro-biological basis of this phenomenon will be discussed elsewhere.

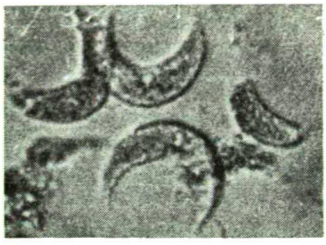
A detailed characterization of the individual alga species can not be given here because of the lack of space. The new taxons will be described elsewhere. The aim of the present investigation was a primary summing-up of the algal flora with special respect to the problems connected to the establishment of the future reservoir. At any rate, the 258 taxons (species, variatio, forma) found in the two dead arms indicate a rich alga flora. In the list of the taxons found, there is a question-mark *before* the name of the algae if the determination was uncertain; a question-mark *behind* the name indicates a loose determination.

Discussion

The two dead arms at Tiszaalpár and Tiszaug will have different fates in the future. The former one becomes an important part of a huge reservoir; the latter remains a dead arm and makes a comparison possible between the emerging new alga population of the reservoir and that of the dead arm at Tiszaug, the latter retaining many of its old characteristics. In such a comparison, however, we have to take into account that the dead arm at Tiszaug not only will go on with the process of siltation but will be more and more utilized for fishing purposes in the future. Although this type of its developing has already begun, no regular dunging is made and so it will not become excessively eutrophic even in years from now. The future reservoir will include the dead arm at Tiszaalpár, the field and meadow of Alpár and the non-protected southern part of the dead arm at Lakitelek–Tőserdő, and will be utilized at least for two purposes. On one hand, it provides water for the agricultural irrigation e.g. in the "Tiszazug" district; on the other hand, it can develop into the centre of a recreation area. The first traces of this can already be noticed near to Tiszaújfalu (fused with the old Alpár community). The latter direction of development, however, necessarily needs an increased protection of the natural environment. At the present the sewage water is directly channeled into the dead arm. In the future, not only this has to be ceased but the purification of sewage water from both the enlarged community and the recreational area has to be solved.

Still before beginning the building operations, a major scientific task will be studying the field and meadow of Alpár in the hydrological, geological-pedological,

Plate IV



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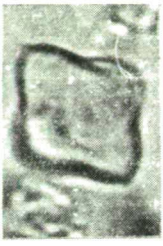

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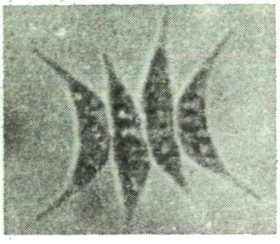

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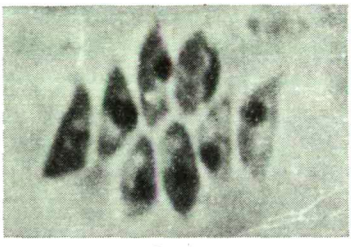

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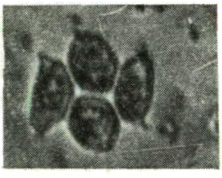

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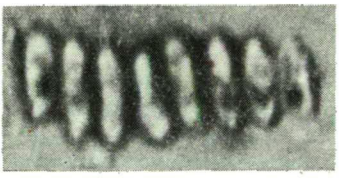

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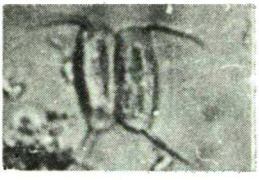

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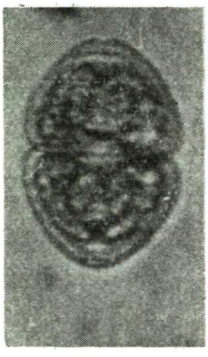

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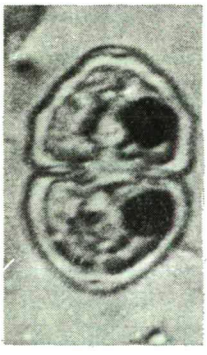

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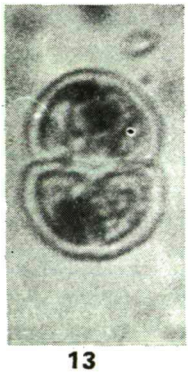

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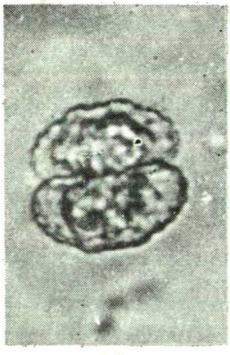

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as well as hydrobiological and algological points of view. In the lower parts of the meadow, especially near to the dead arms or on the areas between them, there are ponds in which the water stagnates. On the field of Alpár to the east of Bokros community, merge the water-courses coming from the northwest, then they turn to the east and lead a part of the water of the meadow into the Tisza. These ponds and water-courses have a rich alga vegetation which can significantly influence the development of the alga flora of the future reservoir. A better knowledge of them can help to keep the alga vegetation and, through this, the whole living population of the reservoir in the desired equilibrium.

References

BOURRELLY, P. (1957): Recherches sur les Chrysophycees. — Rev. Algol. Hors. Serie *1*, 1–412.

BRADLEY, D. E. (1964): Study of the Mallomonas, Synura and Chrysosphaerella of Northern Iceland. — J. Gen. Microbiol. *37*, 321–333.

BRUNNTHALER, J. (1930): Protococcales. — Pascher's Süssw. *5*, 52–205.

CHOLNOKY, B. J. (1960): Beiträge zur Kenntnis der Ökologie der Diatomeen in dem Swartkops-Bache nahe Port Elizabeth (Südost-Kaapland). — Hydrobiol. *15*, 229–287.

— (1964): Die Diatomeenflora einiger Gewässer der Ruwenzori-Gebirge in Zentralafrica. — Nowa Hedwigia *8*, 55–101.

— (1970): Die Diatomeenassotiationen im Noti Bach in Natal (Südafrica). — Nowa Hedwigia H. *31*, 313–329.

CLEVE-EULER, A. (1951–1955): Die Diatomeen von Schweden und Finnland I–V., Stockholm.

CZURDA, V. (1932): Zygnemales. — Pascher's Süssw. *9*, 1–232.

FELFÖLDY, L. (Red.): BARTHA, Zs., FELFÖLDY, L., HAJDÚ, L., HORVÁTH, K., KISS, K., SCHMIDT, A., TAMÁS, G., UHERKOVICH, G., VÖRÖS, L. (1976): A zöldalgák rendjének (Chlorococcales) kishatározója. — Vízügyi Hidrobiológia 4, 3–343. (Determinierungswerk für Cholorococcales-Grünalgen).

FJERDINGSTAD, E. (1965): Taxonomy and Valency of Benthic Phytomicro-organisms. — Internat. Revue der Gesamten Hydrobiologie *4*, 475–503.

FOTT, E. (1952): Mikroflora oravskych raselin. — Preslia *24*, 189–209.

GEITLER, L. (1925): Cyanophyceae. — Pascher's Süssw. *12*, 1–481.

GORJUNOVA, Sz. V., RZSANOVA, G. I., ORLEANSZKIJ, V. K. (1969): Szinezelenije vodoroszli. — Akad. Nauk. Sz. Sz. Sz. R., 3–193.

HEERING, W. (1914): Ulotrichales. — Pascher's Süssw. *6*, 9–145.

— (1921): Siphonocladales, Siphonales. — Pascher's Süssw. *7*, 1–103.

DEDUSENKO-SEGOLEVA, N. T., HOLLERBACH, M. M. (1962): Xantophyta. Opred. presnov. Vod. U. S. S. R. *5*, 7–272.

◄ Plate IV

1. *Selenastrum Bibraianum* REINSCH — 600:1.
2. *Tetraedron proteiforme* (TURN.) BRUNNTHALER — 400:1.
3. *Tetraedron minimum* var. *srobiculatum* LAGERHEIM — 1200:1.
4. *Tetraedron minimum* (A. BRAUN) HANSGIRG — 1000:1.
5. *Scenedesmus acuminatus* (LAGERHEIM) CHODAT — 900:1.
6. *Scenedesmus acutus* f. *costulatus* (CHODAT) UHERKOVICH — 1200:1.
7. *Scenedesmus denticulatus* var. *linearis* HANSGIRG — 1000:1.
8. *Scenedesmus denticulatus* LAGERHEIM — 500:1.
9. *Scenedesmus acutus* f. *semiellipticus* UHERKOVICH — 1200:1.
10. *Scenedesmus quadricauda* var. *quadrispina* f. *gracillimum* UHERK. — 1000:1.
11. *Cosmarium granatum* BRÉBISSON — 1000:1.
12. *Cosmarium granatum* BRÉB. f. *monstruosa ?* — 1200:1.
13. *Cosmarium rectangulare* GRUNOW — 700:1.
14. *Cosmarium commisurale* var. *crassum* NORDSTEDT — 1000:1.

Table 1

No	Species (taxon)	Tiszaalpár					Tiszaug			
		1975	1976		1977	1978	1975	1976	1977	1978
		15 VI	29 IX	3 XI	18 II	5 VIII	15 VI	29 IX	18 II	4 VIII
	Phylum (divisio): *Schizomycophyta*									
1.	*Spirillum undula* EHR.	3	2			2		2		
2.	*Beggiatoa alba* (VAUCH.) TREV.		3	2						
3.	*Beggiatoa leptomitiformis* (MENEGH.) TREV.	2	1					2		
4.	*Spirochaeta plicatilis* EHR.	2	2				3	2		
	Phylum (divisio): *Cyanophyta*									
5.	*Microcystis aeruginosa* f. *pseudofilamentosa* (CROW) ELENK. (Plate I. 3.)	3	3	3				2		
6.	*M. ichthyoblabe* KÜTZ.	1	3							2
7.	*M. ? viridis* (A. BRAUN) LEMM.	2		1	3		2			
8.	*M. delicatissima* (W. et G. S. WEST) STARMACH	2	3				2			
9.	*M. incerta* (LEMM.) STARMACH	3						3		
10.	*Gloeocapsa crepidinum* THURET	2		2						
11.	*G. turgida* (KÜTZ.) HOLLERBACH		2						2	
12.	*Eucapsis minor* (SKUJA) HOLLERBACH				2					
13.	*Coelosphaerium dubium* GRUN. (Plate I. 4)	3				1		2		1
14.	*C. anomalum* (BENNET) DE TONI et LEVI		2				1		1	
15.	*C. Kuetzingianum* NAEGELI		2			3		2		
16.	*Gomphosphaeria aponina* KÜTZ.	3	3	3				2		
17.	*G. Naegeliana* (UNGER) LEMM.	2					2		1	
18.	*Pseudocapsa dubia* ERGEROVIC		2							2
19.	*? Tetrachloris inconstans* PASCHER				3					
20.	*Pelogloea bacillifera* LAUTERBORN			1					2	
21.	*Chamaesiphon confervicola* A. BRAUN				2			2		
22.	*Ch. incrustans* GRUNOW			2					2	
23.	*? Cyanophanon mirabile* GEITLER	1					2			
24.	*Hydrococcus rivularis* (KÜTZ.) MENEGH.			3	3			3	3	

No	Species (taxon)	Tiszaalpár					Tiszaug			
		1975	1976		1977	1978	1975	1976	1977	1978
		15 VI	29 IX	3 XI	18 II	5 VIII	15 VI	29 IX	18 II	4 VIII
25.	*Xenococcus minimus* GEITLER		2						2	2
26.	*Merismopedia punctata* MEYEN		3		1					
27.	*M. glauca* (EHR.) NAEG.			2			2		3	
28.	*Holopedia Dieteli* (RICHT.) MIG.	2				2				
29.	*Dactylococcopsis raphidioides* HANSG.	1	2	2	2	2		3	1	
30.	*D. Elenkinii* ROLL.			2	2					
31.	*D. acicularis* LEMMERMANN		1				1	2		
32.	*Tetrapedia Reinschiana* ARCHER		1					1	2	
33.	*Stigonema spec.* (*St. minutum?* Plate I. 1.)			1				3	1	
34.	*Calothrix stellaris* BORNET et FLAH.			2					2	
35.	*C. parietina* (NÄG.) THURET		1				2	1		
36.	*Gloeotrichia Rabenhorstii* BORN.		2	2						
37.	*G. natans* (HEDW.) RABENH.	3			2			1		
38.	*Rivularia dura* ROTH			1						2
39.	*Nodularia spumigena* MERTENS					2		3	1	
40.	*N. spumigena* var *litorea* (THUR.) BORN et FLAH.		2				2	2		
41.	*Aphanizomenon flos aquae* (L.) RALFS			1			2	2		
42.	*Anabaena variabilis* KÜTZ.	2	1	2	1					
43.	*A. catenula* (KÜTZ.) BORN. et FLAH.		2						2	2
44.	*A. spiroides* KLEBAHN					2	3			
45.	*Anabaenopsis Arnoldii* APTEKARJ		2	3				2		2
46.	*A. Elenkinii* MILLER	2		1		1			1	2
47	*Remeria leopoliensis* (RACIB.) KOCZW.				1		2			
48.	*R. gracilis* KOCZWARA	3		2		2		1		
49.	*Spirulina maior* KÜTZ.	1	3	2	2	1	1	1	1	1
50.	*Sp. laxissima* KÜTZ.	2		2			3		2	2
51.	*Oscillatoria planctonica* Wolosz.		1	1						
52.	*O. Boryana* (Agardh) Bory				1			2		
53.	*O. animalis* AGARDH.	2			2					
54.	*O. laetevirens* (CROUAN) GOMONT		2						1	1
55.	*O. chalybea* MERTENS			1		2				
56.	*O. formosa* BORY	2					2			

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		1975	1976		1977	1978	1975	1976	1977	1978
		15 VI	29 IX	3 XI	18 II	5 VIII	15 VI	29 IX	18 II	4 VIII
57.	*O. simplicissima* GOMONT		2	3	3				3	2
58.	*O. tenuis* AGARDH		1	2	2		2	2		2
59.	*O. maior* VAUCHER (Plate I. 5)	2	3	2						
60.	*O. brevis* (KÜTZ.) GOMONT			3	2			2		
61.	*O. simplicissima* GOMONT	3	1		1		2			
62.	*Phormidium purpurascens* (KÜTZ.) GOM.			1				3	2	
63.	*Ph. ambiguum* GOMONT			3					1	
64.	*Ph. favosum* (BORY) GOMONT		2					1		
65.	*Ph. mucicola* HUBER-PEST. et NAUMANN (Plate. I. 2)			2	1			3	3	
66.	*Ph. tenue* (MENEGH.) GOMONT			2				1		
67.	*Ph. papyraceum* (AGARDH) GOMONT		1					2		2
68.	*Ph. corium* (AG.) GOMONT		2		1					2
69.	*Lyngbya limnetica* LEMM.	3	1	3			2	2		2
70.	*L. Martensiana* MENEGH.	3	3			1	2	3	1	1
71.	*L. stagnina* KÜTZ.		2					1		
72.	*L. spiralis* GEITLER			1			2			2
73.	*Schizothrix polytrichoides* FRITSCH	2	1				3	3	2	2
	Phylum (divisio): *Euglenophyta*									
74.	*Colacium simplex* HUBER-PEST.	2	2				3			
75.	*Klebsiella spec (?)*		1					1		
76.	*Euglena acus* EHRENB. (Plate II. 2–4)	2	2	1	2	2	1	2	2	2
77.	*E. chlamydophora* MAINX			2				1		
78.	*E. gracilis* KLEBS	2	2				2			
79.	*E. limnophila* LEMM.			2				1		
80.	*E. velata* KLEBS		1				3			
81.	*E. proxima* DANG. (Plate II. 6)	2	3	2	1	2	2	1	1	1
82.	*E. tripteris* (DUJ.) KLEBS			2				2		
83.	*E. oxyuris* SCHMARDA (Plate II. 1)	2	2	3		2		2	1	
84.	*E. caudata* var. *minor* DEFLANDRE (Plate II. 5)		3	3				1		
85.	*E. polymorpha* DANG	2	3	4	2	4				
86.	*Lepocinclis Lefevrey* CONRAD (Plate II. 10)	2	2	1	1	2		1		
87.	*L. ovum* (Ehr.) LEMM.		2	2						
88.	*L. Steinii* LEMM. em. CONRAD	2						2		
89.	*Phacus longicauda* (EHR.) DUJ.	1		2						1

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		1975	1976		1977	1978	1975	1976	1977	1978
		15 VI	29 IX	3 XI	18 II	5 VIII	15 VI	29 IX	18 II	4 VIII
90.	*Ph. helikoides* POCHMANN (Plate II. 7)	2	2		2					
91.	*Ph. alatus* KLEBS (Plate II. 8)	3	3	3	1	1				
92.	*Ph. caudatus* HÜBNER					2		1		
93.	*Ph. acuminatus* STOKES (forma?) (Plate II. 9)			2				2	2	2
94.	*Ph. aenigmaticus* DREZ.	2			2				1	
95.	*Ph. inflexus* (KISSELEW) POCHMANN		2	2				3	2	
96.	*Ph. pyrum* (EHRENB.) STEIN	1	3	3	3	1	1	2	1	2
97.	*Ph. striatus* FRANCÉ		2					1		
98.	*Trachelomonas volvocina* EHRENB. (Plate II. 11)	2	1	3	2	2	1	2	2	2
99.	*Tr. volvocina* var. *derephora* CONR.	1	2	1				1	1	
100.	*Tr. intermedia* DANG.				2			1		
101.	*Tr. crebea* KELLICOTT emend. DEFL.		2	2			1			
102.	*Tr. planctonica* SWIRENKO				2			2		
103.	*Tr. granulata* SWIRENKO		3	2				1		
104.	*Tr. similis* STOKES	2	2					2		
105.	*Tr. scabra* PLAYFAIR (Plate II. 12)	1	1	3	1	1	2	3	2	2
106.	*Strombomonas verrucosa* var. *conspersa* (PASCHER) DEFLANDRE		2	2						
107.	*Str. verrucosa* VAR. *zmiewika* (SWIR.) DEFL.	3	1	1						
	Phylum (divisio):									
	Chrysophyta									
	Xanthophyceae:									
108.	*Chlorobotrys simplex* PASCHER	1						2		
109.	*Ophiocytium capitatum* WOLLE		2				2	1		
110.	*Tribonema affine* G. S. WEST						4		3	3
111.	*T. minus* G. S. WEST								2	
	Chrysophyceae:									
112.	*Chrysococcus biporus* SKUJA		2						2	1
113.	*Kephyrion cylindricum* (LACK.) CONR.	1						2		
114.	*Dinobryon sertularia* EHRENB.			3			3	2	2	2
115.	*D. divergens* IMHOF		2	2				2	1	1
116.	*Ochromonas nasuta* SKWORT.	1						2	2	
117.	*Mallomonas caudata* IWANOFF		1				2			

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		1975	1976		1977	1978	1975	1976	1977	1978
		15 VI	29 IX	3 XI	18 II	5 VIII	15 VI	29 IX	18 II	4 VIII
	Bacillariophyceae:									
118.	*Melosira varians* AG.						2			
119.	*Cyclotella Kützingiana* THWAITES		2		2			1	2	2
120.	*Diatoma vulgare* BORY	1						2	1	
121.	*Fragilaria capucina* DESMAZIÉRES			2	2				1	
122.	*Fr. crotonenesis* KITTON			1	1					2
123.	*Asterionella formosa* HASSALL		1					2	2	
124.	*Synedra ulna* var. *spathulifera* GRUNOW	1					2			
125.	*Syn. capitata* EHRENB.				2			2		
126.	*Caloneis amphisbaena* (BORY) CLEVE	1	3	1	1	2	2	3	3	2
127.	*Stauroneis parvula* GRUNOW (Plate III. 1)		1				2	2	2	
128.	*Navicula gracilis* EHR. (Plate III. 7)	2	2		1	2		1		
129.	*N. placentula* f. *lanceolata* GRUN. (Plate III. 3)		3	2		1	3	1	1	2
130.	*Navicula cryptocephala* KÜTZ.	3		2			1	3	3	1
131.	*N. cincta* (EHRENB.) KÜTZ.		3		1	2		1		
132.	*N. lanceolata* (AGARDH) KÜTZING			2				2	2	
133.	*Pinnularia viridis* var. *sudetica* (HILSE) HUSTEDT (Plate III. 2)	2	1				2	1	1	1
134.	*Amphora commutata* GRUNOW			2			1	1		
135.	*Cymbella affinis* KÜTZ.		2				2		2	
136.	*C. cistula* (HEMP.) GRUNOW (Plate III. 4)	2	1	1		2	1	2	1	2
137.	*C. tumida* (BRÉB.) van HEURCK (Plate III. 5)		3	2	2			3	2	2
138.	*C. cymbiformis* (KÜTZ.) VAN HEURCK			1		2	2			
139.	*C. prostrata* (BERKELEY) CLEVE		1					1	1	
140.	*Gomphonema acuminatum* EHRENBERG (Plate III. 6)	1	2		2	1	2			2
141.	*G. augur* EHRENB.		1	1	1			2	1	
142.	*G. constrictum* EHRENB.	1	2	2		2	1	1		
143.	*Rhopalodia gibba* (EHRENB.) O. MÜLL.			1	1			1	2	2
144.	*Nitzschia sigmoidea* (EHR.) W. SMITH	2	3	2	2				1	1

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		15 VI	29 IX	3 XI	18 II	5 VIII	15 VI	29 IX	18 II	4 VIII
145.	*Cymatopleura solea* (BRÉB.) W. SMITH	1	1	1	1	2	2	3	2	2
146.	*Surirella ovalis* BRÉB. (Plate III. 8)	2	3	2	2	3	1	3	1	1
	Phylum (divisio): *Pyrrophyta*									
147.	*Ceratium hirundinella* f. *silesiacum* (SCHROED.) HUBER-PESTALOZZI						2	1		
148.	*Glenodinium edax* SCHILLING		1				1	2		
149.	*Glenodiniopsis uliginosa* (SCHILL.) WOLOSZ.			1			2			
150.	*Peridinium cinctum* (MÜLL.) EHR.	2	2					1	2	1
151.	*P. Volzii* LEMMERMANN						3			
152.	*P. palatinum* LAUTERB.							2	2	2
153.	*P. bipes* f. *globosus* LINDEM.		1				1			
154.	*P. Cunningtonii* LEMM.	1				1		1	1	1
155.	*P. aciculiferum* LEMM.			1			2			
	Phylum (divisio): *Chlorophyta* *Chlorophyceae:*									
156.	*Chlamydomonas Steinii* GOROSCH.		3					2		
157.	*Chl. intermedia* CHODAT						4			
158.	*Chl. Reinhardii* DANGEARD	4					4			
159.	*Eudorina elegans* EHRENB.	2	3	2	1	1	2	4	2	2
160.	*E. charkoviensis* PASCHER			2				2		
161.	*E. cylindrica* KORSCHIKOW	1					2	2		
162.	*Desmatractum indutum* (GEITLER) PASCHER		1					1		
163.	*Tetraedron muticum* (A. BR.) HANSG.	1	2		2				2	2
164.	*T. trigonum* (NÄG.) HANSG.			3			1			
165.	*T. proteiforme* (TURN.) BRUNNTHALER (Plate IV. 2)		2		1		3		1	1
166.	*T. caudatum* (CORDA) HANSG.	1				1			1	
167.	*T. regulare* KÜTZ.		1				1	1		
168.	*T. minimum* (A. BRAUN) HANSGIRG (Plate IV. 4)	2		1	2	1		3		
169.	*T. minimum* var. *scrobiculatum* LAGERH. (Plate IV. 3)	1		2		2		1		2
170.	*T. pentaedricum* W. et G. S. WEST		2				2			
171.	*Polyedriopsis spinulosa* SCHMIDLE				2		3	1	1	

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		15 VI	29 IX	3 XI	18 II	5 VIII	15 VI	29 IX	18 II	4 VIII
172.	*Schroederia setigera* (Schröd.) Lemm.		3				2	2		
173.	*Characium ambiguum* Hermann		3						1	1
174.	*Ch. angustum* A. Braun			2			1			
175.	*Ch. Braunii* Brügg.	1						2		
176.	*Oocystis lacustris* Chodat		2	2					1	
177.	*O. Naegelii* A. Braun	1					3	3		3
178.	*Chodatella citriformis* Snow				1				2	
179.	*Lagerheimia genevensis* Chodat		1							2
180.	*Franceia echidna* (Bohl.) Kors.		2					1		
181.	*? F. ovalis* (Francé) Lemm.			1			2			
182.	*Nephrochlamys subsolitaria* (G. S. West) Kors.	2	1			2		1		
183.	*Kirchneriella obesa* (W. West) Schmidle	3	1	2	2	2	2	2		3
184.	*K. irregularis* (G. M. Sm.) Kors.		2							
185.	*Selenastrum bibraianum* Reinsch (Plate IV. 1)	2		1			3	3		
186.	*S. Westii* G. M. Sm.				2			1		
187.	*Ankistrodesmus falcatus* (Corda) Ralfs	2	1	1	1	1	1	1	1	1
188.	*A. acicularis* (A. Braun) Kors.		2	2				1		
189.	*A. Braunii* var. *pusilla* Printz						2			
190.	*A. angustus* Bern.	1				2	1			1
191.	*Fusola viridis* Snow		2					1		
192.	*Quadrigula Chodatii* (Tan.–Ful.) G. M. Sm.						2			
193.	*Dactylococcus infusionum* Näg.	3								
194.	*Botryococcus Braunii* Kützing		2					3		
195.	*Dictyosphaerium anomalum* Kors.	1					2	1		1
196.	*D. pulchellum* Wood						1	1	1	2
197.	*Didymocystis bicellularis* (Chod.) Komárek		1			1		1	1	1
198.	*Coelastrum microporum* Näg.	1	1	3	1	1	1	2	2	2
199.	*C. sphaericum* Näg.		1				2			1
200.	*C. sphaericum* var. *punctatum* Lagh.	1						1		
201.	*Crucigenia rectangularis* (Näg.) Gay.		3			1	2	1	1	1

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		1975	1976		1977	1978	1975	1976	1977	1978
		15 VI	29 IX	3 XI	18 II	5 VIII	15 VI	29 IX	18 II	4 VIII
202.	*Cr. tetrapédia* (KIRCHN.) W. et G. S. WEST	1	1	3	1	2	1	2	1	1
203.	*Cr. apiculata* (LEMM.) SCHMIDLE		2		2	2	3		1	1
204.	*Cr. quadrata* MORREN	2	1			1	2	2	2	2
205.	*Tetrastrum staurogeniaeforme* (SCHRÖD.) LEMM.			2	1		1	2	2	2
206.	*T. heteracanthum* (NORDST.) CHODAT	2	1	1			2	1		
207.	*T. triacanthum* KORS.							2		
208.	*T. glabrum* (ROLL) AHLSTR. et TIFF.			2		2			1	2
209.	*? Hofmania lunatum* THOMPSON	1			1			1		
210.	*Scenedesmus acutus* MEYEN		3		2		2	2	2	1
211.	*Sc. acutus* f. *costulatus* (CHOD.) UHERK. (Plate IV. 6)	2	1	1		1		3		
212.	*Sc. acutus* f. *semiellipticus* UHERK. (Plate IV. 9)	1					2		1	
213.	*Sc. dactylococcopsis* CHODAT			3				2		
214.	*Sc. securiformis* PLAYFAIR		1				2	2	2	
215.	*Sc. acuminatus* (LAGERHEIM) CHODAT (Plate IV. 5)	1	1	1	1	2	2	3	1	1
216.	*Sc. acuminatus* var. *Bernardii* (G. SMITH.) DEDUSS.	1	1				1	1		
217.	*Sc. acuminatus* var. *elongatus* G. M. SMITH			1				3		1
218.	*Sc. ecornis* (RALFS) CHODAT	2	1	2	1	1	3	1	1	1
219.	*Sc. ecornis* var. *disciformis* CHOD.		1				2	2		
220.	*Sc. ovalternus* CHODAT	1						2		
221.	*Sc. tibiscensis* UHERKOV.			2						1
222.	*Sc. brevispina* (G. M. SMITH) CHOD.	1						2		1
223.	*Sc. denticulatus* LAGH. (Plate IV. 8)	1	3	2	1	1	2	1	1	1
224.	*Sc. denticulatus* var. *linearis* HANSG. (Plate IV. 7)		1	1				1		
225.	*Sc. dispar* BRÉB.	1						2		
226.	*Sc. quadricauda* (TURP.) BRÉB.	2	1	2	1	3	2	1	1	2
227.	*Sc. quadricauda* var. *quadrispina* f. *gracillimus* UHERK. (Plate IV. 10)		2				1	2		
228.	*Sc. quadricauda* var. *biornatus* KISS I.		1				1	2		
229.	*Sc. bicaudatus* (HANSG.) CHODAT		1	2						1

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		1975	1976		1977	1978	1975	1976	1977	1978
		15 VI	29 IX	3 XI	18 II	5 VIII	15 VI	29 IX	18 II	4 VIII
230.	*Sc. bicaudatus* var. *brevicaudatus* HORTOB.	1		1	1			1	1	1
231.	*Sc. arcuatus* f. *spinosus* HORTOB. et NÉMETH		2	1					1	
232.	*Sc. ellipsoideus* var. *bicaudatus* HORTOB. et NÉMETH		1					2		
233.	*Actinastrum Hantzschii* LAGERH.	2	2	1			3	3	1	1
234.	*A. Hantzschii* var. *gracile* ROLL						2	1	2	2
235.	*Pediastrum simplex* MEYEN	3	2	2	1	1	2	3	1	2
236.	*P. simplex* var. *clathratum* (SCHROETER) CHODAT	1					1	1		
237.	*P. tetras* (EHRENB.) RALFS	1	1	1	1	2	1	1	1	2
238.	*P. tetras* var. *tetraodon* (CORDA) RABENH.		1			1	1	1		
239.	*P. Boryanum* (TURP.) MENEGH.	2	2					2		2
240.	*P. Boryanum* var. *brevicorne* A. BRAUN		1				1			
241.	*P. duplex* MEYEN	1	1	1		2	1	2		1
242.	*Hormidiopsis crenulata* (KÜTZ.) HEER. (Plate III. 12)	2	3			1	2	2	1	2
243.	*Hormidium flaccidum* A. BRAUN				4			2		
244.	*Stigeoclonium tenue* KÜTZING			3				3		
245.	*St. longipilum* KÜTZING	2				2		3		
246.	*Oedogonium* spec.		3				3			
247.	*Cladophora fracta* KÜTZ. ampl. BRAND	4	4	3			4	4		
	Conjugatophyceae:									
248.	*Closterium moniliferum* (BORY) EHR.						2			2
249.	*C. acerosum* (SCHRANK) EHR.						1	2		
250.	*C. Kützingii* BRÉB.						1			
251.	*Cosmarium granatum* BRÉB. (Plate IV. 11)						1	2		2
252.	*C. granatum* BRÉB. f. *monstruosa?* (Plate IV. 12)							1		
253.	*Cosmarium rectangulare* GRUN. (Plate IV. 13)							2		
254.	*C. commissurale var. crassum* NORDST. (Plate IV. 14)						2	1		
255.	*Spirogyra areolata* LAGERH.	4			3		4	4		
256.	*Sp. varians* (KÜTZ.) CZURDA		2				3		3	
257.	*Mougeotia sphaerocarpa* WOLLE	4						3		
258.	M. *angusta* HASSAL	2					2	3		

HORTOBÁGYI, T. (1939): Qualitative Untersuchungen des Phytoplanktons des toten Armes "Nagyfa" der Tisza. — Folia Cryptogamica *3/2*, 151–216.
— (1941): Újabb adatok a Tisza Nagyfa-holtága fitoplanktonjának kvalitatív vizsgálatához. I. Neuere Beiträge zur qualitativen Untersuchung des Phytoplanktons im toten Theiss-Arme "Nagyfa" I. — Bot. Közl. *38*, 151–170.
— (1954): Les nouevaux micro-organismes de l'établissement piscicole de Hortobágy et du lac Szelid. — Acta Bot. Acad. Scient. Hung. *1*, 89–123.
HUBER-PESTALOZZI, G. (1938): Blaualgen, Bakterien, Pilze. — Das Phytopl. des Süssw. *1*, 1–342.
— (1941): Chrysophyceen, farblose Flagellaten, Heterokonten. — Das Phytoplankton des Süsswassers *2/1*, 4–365.
— (1942): Diatomeen. — Das Phytoplankton des Süssw. *2/2*, 23–549.
— (1950): Cryptophyceen, Choloromonadienen, Peridineen. — Das Phytopl. des Süsswassers *3*, 1–310.
— (1955): Euglenophyceen. Das Phytopl. des Süsswassers *4*, 1–606.
HUSTEDT, Fr. (1930): Bacillariophyta (Diatomeae). — Pascher's Süssw. *10*, 1–466.
KISS, I. (1977): Variability of Scenedesmus ecornis (Ralfs) Chod. in the dead-arm of the river Tisza at Körtvélyes. — Tiscia (Szeged) *12*, 49–57.
— (1978): Algological investigations in the dead-Tisza at Lakitelek-Tőserdő. — Tiscia (Szeged) *12*, 27–47.
— (1978a): Occurence of Synura uvella Ehr. var. tiszaensis n. var. in the dead arm of the river Tisza near Lakitelek. — Tiscia (Szeged) *12*, 49–54.
KOL, E. (1931): Zur Hydrobiologie eines Natronsees bei Szeged in Ungarn. — Verhandl. der Intern. Ver. f. theor. u. angew. Limn. *5/1*, 103–157.
— (1931): Vorarbeiten zur Kenntnis der Algenvegetation der Nagy Magyar Alföld (Grossen Ungarischen Tiefebene) II. — Acta Biol. (Szeged) *2/4*, 46–62.
KORSIKOV, A. A. (1929): Studies on the Chrysomonads I. — Archiv für Protistenkunde *67*, 253–290.
— (1953): Protococcineae: Vacuolales, Protococcales. — Akad. Nauk. Ukr. *5*, 1–439.
KRISTIANSEN, J. (1969): Chrysosphaerella multispina Br. and some other remarkable Chrysophyceae from Lake Aneboda Sweden. — Öst. Bot. Zeit. *116*, 70–84.
— (1972): Studies on the Lorica Structure in Chrysophyceae. — Svensk. Bot. Tidskr. *66*, 184–190.
— (1975): Studies on the Chrysophyceae of Bornholm. — Saertryk af Bot. Tidsskrift *70*. 126–142.
— (1975): On the occurence of the species of Synura (Chrysophyceae). — Verh. Internat. Verein. Limnol. *19*, 2709–2715.
LUND, J. W. G. (1942): Contributions to our knowledge of British Chrysophyceae. — Nem. Phytol. *41*, 274–292.
MATWIENKO, O. M. (1965): Chrysophyta. — Vizn. Pris. Vod. Ukr. *3/1*, 5–367.
MATWIENKO, O. M., LITWINENKO, R. M. (1977): Pyrrophyta. — Akad. Nauk. Ukr. R. Sz. R. *3/2* 3–386.
PANKOW, H. (1963): Bemerkung zur Ökologie von Synura uvella. Öst. Bot. Zeitschrift *110*, 410–416.
PÁKH, E. (1933): Daten zur Mikrovegetation des Szentmihályteleker toten Tisza-Armes. — Acta Biol. (Szeged) *2*, 233–236.
PÉTERFI, I. S. (1965): Observations of Synura Ehrenb. in Rumania with spec attention to Synura splendida Kors. — Rev. Algol. 1965, 52–55.
POPOVA, T. G. (1966): Trachelomonas, Strombomonas, Eutreptia, Euglena, — Flora Sporov. Rast. U. S. S. R. *8*, 5–411.
POPOVA, T. G. and SAPHONOVA, T. A. (1976): Evglenovije vodorosli. (Euglenophyta: Lepocinclis, Monomorphina, Phacus, Ascoglena, Cryptoglena, Petalomonas, Calycimonas, Rhizaspis). — Flor. Sporov. Rast. USSR *9*, 5–287.
ROSA, K. (1951): Algenflora von Südböhmen. — Studia Botanica Cehoslovaka *12/3*, 173–232.
RUZICKA, J. (1956): Die Desmidiaceen der Moravice-Quellen (Grossel Kessel, Gesenke). — Prirodov. sbornik Ostravsk. Kraje *17*, 38–58.
— (1957): Die Desmidiaceen der Oberen Moldau (Böhmerwald). — Preslia *29*, 137–154.
— (1964): Desmidiaceen der feuchten Felsen in der Hohen Tatra. — Gatunki Desmidiaceae wilgotnych skal w Wysokich Tatrach. — Fragmenta Floristica et Geobotanica *10*, 103–119.
— (1972): Die Zieralgen der Insel Hiddensee. The Desmids from the Island Hiddensee. — Arch. f. Protistenkunde *114*, 453–485.
SHTINA, E. A. (1967): Itogi i zadacsi Experimentalnich Iszledovanij v pocvennoj algologii. — Spvr. sostojanie perpektivi iz. pocv. vod. USSR Kirov, 3–22.
SIEMINSKA, J. (1964): Bacillariophyceae okrzemki. — Flora Slodkov. Polski *6*, 5–610.
STARMACH, K. (1966): Cyanophyta-Sinice, Glaucophyta-Glaukofity. — Flore Slodkov. Polski *2*. 5–806.

SZEMES, G. (1947): Ökologische Untersuchungen über die Bacillariophyten — Flora des Zagyva-Flusses. — Borbásia 7, 70–121.
TEMNISKOVA-TOPALOVA, D. (1966): Über die Flora von Euglenophyta und Volvophyceae in Bulgarien III. — Annuaire de l'Univ. Sofia *50*, 43–57.
UHERKOVICH, G. (1958): Das Leben der Tisza VI. Mallomonas Arten aus der Tisza und einem "Toten Arm" der Tisza. — Acta Biol. (Szeged) *4/3*, 167–171.
— (1959): Adatok a Tisza holtágainak mikrovegetációjához I. A szolnoki Tisza holtágainak algái 1957 őszén. Beiträge zur Kenntnis der Algenvegetation der Tisza (Theiss) Altwässer I. Die Algen des szolnoker "toten Tiszaarmes" im Herbst 1957. — Bot. Közl. *48*, 30–40.
— (1959): Das Leben der Tisza VIII. Beiträge zur Typisierung der Algenvegetation von Erdgruber der Tisza. — Acta Biol. (Szeged) *5*, 49–59.
— (1966): Die Scenedesmus Arten Ungarns. Akadémiai Kiadó, Budapest, 7–173.
— (1969): Über das Phytoseston der eutrophierten Theiss (Tisza). I. Beobachtungen im Juli 1968. — Tiscia (Szeged) *5*, 37–47.
WODENITSCHAROFF, D. (1962): Hydrobotanische Untersuchungen über das Urdinokar (N–W Rila-Gebirge). — Annuaire de l'Univ. de Sofia 54–55.
WODENITSCHAROFF, D., DRAGANOV, St., and TEMNISKOVA, D. (1971): Vodorasli Flore na Bulgaria „Narodne Prosveta", 5–641.
WEST, W. and G. S. WEST (1904, 1905, 1908, 1911): A monograph of the British Desmidiaceae I–IV. London, — Printed for the Ray Society.

A Tisza folyó tiszaalpári és tiszaugi holtágainak algológiai vizsgálata

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Kivonat

Az értekezésben a Tisza folyó két holtágának algaflórája és algavegetációja kerül rövid ismertetésre az 1975—1978 években végzett vizsgálatok alapján. A két biotopból összesen 258 species vagy speciesen belüli taxon került elő. A vizsgálatok végzését a környezetvédelmi szempontokon túl főként az indokolta, hogy e két állóvíz sorsa a jövőben eltérően alakul. A kisebbik továbbra is holtág marad, mindinkább halászati hasznosításra kerül, a nagyobbik holtág és tágabb környezete viszont a jövőben megépítendő Tisza-III Vízlépcső víztározójának területére esik. A felduzzasztott víz mezőgazdasági területek öntözésére és üdülési célokra hasznosul. A munka hidrobiológiai-algológiai vonatkozásban megemlíti azokat a teendőket is, amelyek a víztározó építését megelőzik.

Algološka ispitivanja mrtvaja Tise kod Tiszaalpár-a i Tiszaug-a

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Abstract

U radu je, na osnovu ispitivanja u periodu 1975—1978. god., dat kratak prikaz algoflore algovegetacije sa dve mrtvaje Tise. Sa oba biotopa prikupljeno je ukupno 258 vrsta ili taksona unutar vrsta. Opravdanost ovih ispitivanja, osim zaštite životne sredine, javlja se i u tome što će ove dve stajaće vode u skoroj budućnosti imati različiti status. Manja će i dalje ostati kao mrtvaja i uredić. se u ribnjak, dok će veća mrtvaja sa širom okolinom biti potopljena izgradnjom brane III na Tisi. Voda brane će se koristiti za navodnjavanje i rekreaciju.

Rad u hidrološko-algološkom pogledu ukazuje i na one radnje koje prethode izgradnji brane.

Альгологическое исследование двух мёртвых русел р. Тиса — Тисаалпари и Тисауги

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Резюме

В сообщении приводится информация относительно альгофлоры и альговегетации двух мёртвых русел реки Тисы на основании проведенных в 1975—1978 гг. исследований. Из двух биотопов было выделено 258.

Помимо соображений защиты окружающей среды, проведение данных исследований обусловлено в первую очередь тем, что в дальнейшем сугьба этих двух стоячих вод будет различна. Меньшая и дальше останется мёртвым руслом, которое будет использоваться для целей рыбоводства, большее же мёртвое русло вместе с прилегающей к нему местностью относится к территории, где будет сооружено водохранилище каскада Тиса-III. Запруженная вода используется для орошения сельскохозяйственных областей, а такжде ля секурортных целей. В гидробиологическом и альгологическом аспекте работа подчёркивает те мероприятия, которые должны предшествовать сооружению водохранилища.